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SALEM HIGH SCHOOL

HODGKIN'S DISEASE INVESTIGATION

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Introduction

At the request of Mr. Edward Curtin, principal of Salem High School, the Massachusetts Department of Public Health performed an investigation of the incidence of Hodgkin's disease among students at Salem High School. For the four year period (1979-1982) studied there were four cases diagnosed while less than one (.64)* case would have been expected (p=0.004 under Poisson Distribution).

The Division of Environmental Health Assessment conducted interviews with the parents of these four cases in an attempt to discover a cause for the elevation. The age at diagnosis of Hodgkin's disease ranged from 15 to 19 years. The survey instrument utilized in this investigation was developed by Gutensohn and Cole[1] and adapted previously by the Massachusetts Department of Public Health for use in epidemiological studies of Hodgkin's disease.

Background

Salem is situated 19 miles northeast of Boston and for many years has been the site of leather tanneries as well as a variety of other industries. Although many of the old industries have now become defunct, the city remains somewhat industrialized. The current population in Salem is approximately 38,220.

*Based on Connecticut S.E.E.R. rates

Case Definition

A case is defined as a confirmed Hodgkin's disease in a Salem resident aged 15-19 years that attended Salem High School and was diagnosed during the period 1979-1982.

Case Findings

Cases were identified by Mr. Curtin of Salem High and verified by the medical records and tumor registry staff at Salem Hospital. All cases had the same histology (nodular sclerosis). During the search by Salem hospital two other cases were identified (one in 1974 and one in 1975), but one case had expired while the latter refused to participate in the study.

Interviews

The survey instrument developed by Gutensohn and Cole and adapted by the Massachusetts Department of Public Health was utilized in this investigation. The average length of each interview was approximately 45 minutes. The following information was obtained on cases:

Vital Statistics/Residential Information

-name

-date of birth

-marital status

-present address

-dates and places of

prior residence

Childhood & Home Environment

-sibship size

-number of childhood playmates

-number of children that shared bedroom of case

Dental History

-quality of dental care

Medical History

-age at diagnosis of Hodgkin's disease and type

-past medications

-tonsillectomy information on cases and siblings

Childhood Infectious Diseases

-chicken pox

-measles

-German measles

-incidence of infectious mononucleosis in cases and siblings

Education

-school history of cases

-level of maternal education

-level of paternal education

Occupational Information

-present occupation of cases

-occupational history of cases

-occupational exposures

-paternal/maternal military service exposures

Childhood Environmental Information

-usual play/recreation areas

-usual swimming areas

-types of hobbies

Background on Hodgkin's disease

Hodgkin's disease is one of the few cancers that the medical world has been somewhat successful with in regard to treatment. The current success rate for treatment of Hodgkin's disease is approximately 80%. There are two hypotheses that researchers believe are the most likely causes for the disease:

a) A great deal of research has been conducted by Vianna et al.[2] Vianna's theory is that there is a genetic component to the expression of Hodgkin's disease. His research has been devoted to identifying Hodgkin's disease patients and then searching back through family members to see if there is any connection. Vianna has been unable to confirm this theory.

b) The second theory, which has much more support, but also has not been sufficiently researched, is the view that the incidence of Hodgkin's disease has been thought to be linked in some way to a common childhood infectious disease (possibly the Epstein-Barr

virus). Dr.'s Gutensohn and Cole from the Harvard School of Public Health have done extensive research in support of this theory.[3] This theory puts the following people at a greater risk of developing Hodgkin's disease:

(1) children that come from families with a small sibship size

(2) children that had a small number of playmates during childhood

(3) children that had ≤ 1 sibling sharing their bedroom

(4) children whose mothers had more than twelve years of education

These risk factors suggest that children that have had very little exposure to other children at an early age haven't developed immunity to common childhood infections and hence, are more likely to develop Hodgkin's disease during the ages 15-39.

The majority (3 of 4) of these cases did have fewer playmates during childhood and all four cases had exhibited the risk factor of small numbers of children sharing their bedroom during childhood (all had ≤ 1).

Residential Information

No similarities were discovered in regard to present geographic location of cases, but past residential information revealed that prior to 1969 3 of the 4 cases lived within a close proximity to each other (Census tracts 2041 + 2042).

These 3 cases were evaluated with regard to common risk factors and no striking similarities were discovered.

Medical History

Investigation of past medical histories revealed no similarities.

Infectious Diseases

As mentioned in earlier reports of investigations of Hodgkin's disease, the disease is thought to be in some way linked to a common childhood viral infection. In general, there were no common associations discovered with regard to any of the childhood infectious diseases we investigated. However, all of the cases did contract serious cases of chicken pox at or before the age of eight years old.

Since a control group was never interviewed (due to the small number of cases) no method of comparison exists. Dr. Reardon of the Division of Communicable Diseases of the Department of Public Health notes that "85% of the entire population at risk contracts chicken pox during childhood" so it is not unusual that all four cases had this disease during childhood.

Education

Although all four cases attended Salem High School there was no correlation between dates of attendance at Salem High School and dates of diagnosis of Hodgkin's disease among the four students.

Occupational Information

Since all cases in this study were high school students at the time of diagnosis they were employed for the most part seasonally, in either typical summer jobs or part-time employment. None of the four cases worked in the same company nor did they have similar job duties at their respective places of employment.

Childhood Environmental Exposures

Three of the four cases swam regularly at Forest River Park in Salem, but it is a central recreational area for children in Salem so this does not appear unusual. Two of the four cases were exposed to dust and fumes associated with working, (a known risk factor for Hodgkin's disease), but emphasis must be placed again on the insignificance of this finding due to the small number of cases. No other similarities exist regarding environmental exposures prior to diagnosis.

Conclusions

This investigation has established that an elevation in the incidence of Hodgkin's disease occurred during the four year period 1979-1982 among students at Salem High School. The information obtained on cases failed to establish any association between the effects of environmental exposures and the elevated incidence of Hodgkin's disease. In addition, it is unlikely that the elevation is associated with Salem High since the latency period (time elapsed between exposure and disease symptoms) ranges from 8-10 years and in 1982 the high school itself was only six years old.

Through use of the Massachusetts Cancer Registry the Department of Public Health will continue to monitor Hodgkin's disease and overall cancer incidence in Salem.

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